Titan: a Study of the Lower Atmosphere and Surface

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We have reanalyzed Titan's 1.3-3.0 μm spectrum with radiative transfer techniques to constrain the surface albedo, the distribution and sizes of Titan's haze, and the vertical distribution of methane in Titan's atmosphere. This revisit improves upon previous efforts by including new methane line parameters throughout the near-IR. In addition, a fully connected spectrum (with correct relative albedos) allows us to rigorously constrain haze opacity in the near-IR. Our haze distribution differs significantly from previous distibutions determined from visible observations, which sense higher altitudes than probed with near-IR observations. The new haze opacity and methane line parameters indicate surface albedos that differ from previously published values. Our study also includes a new spectral region at 3.0 microns, another potential window into Titan's atmosphere. The results of this effort provide background information needed for the VIMS experiment and Huygen's Probe on the Cassini Mission.

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